

1.2 Remarks on Part II: Tests of a 4 ft. TH powered model in pond and in beach surf

Examiner noted the new type of pitch control capability displayed by the electric powered TH model, namely approximately $+15^\circ$ and -10° hull angles sustained in time. Applicant explained this was accomplished by its powerful trailing edge flaps, and was intended also to provide steady pitch attitude in rough sea by means of gyroscopic sensors with electric output to attain, with rapid servo control on the flap, a smooth ride. This feature is covered in US patent application 09/677 897, for example its Figs. 14D and 14E.

1.3 Remarks on Part III: Tests of 6 ft. TH powered model in pond and bay

There is enclosed in SHEET 1 (attached), a photo of the 6 ft. TH gas powered model shown in part III of the DVD. Examiner properly observed the hydrodynamic regime in which the bow is raised slightly above the water level, which applicant identified as "transplannar". This is covered in Figs. 14a and 14b of patent application 09/677 897, and some of its Claims. The term "transplannar" denotes a regime different from planning, in that the angle of attack of TH's bottom surface is considerably smaller than that of planning hulls, as a result of TH's maximum beam located at its stern, and in TH not having lateral outflows typical of conventional planning hulls.

1.4 Remarks on Part IV: Surface and subsurface TH model tests in pond and surf

This part of the DVD showed surface and subsurface tests of the three feet electric powered TH model equipped with hydro wings and elevator such as shown in Figs. 3 and 5b of present patent application 677 583. Tests were made in pond and ocean surf. High speed and maneuvering regimes were displayed both on surface and subsurface. Also, Part IV clearly displayed TH's capability of piercing large steep waves, large broken and breaking waves, and also accepting being overtaken by steep and broken waves, such as shown in Figs. 8a and 8b of the present patent application. Examiner remarked on the model's high speed displayed subsurface. Applicant concurred it was very fast (perhaps because favorable Reynolds number regime and/or transitions which were not ascertainable in tests). Photos of the hull of the surface/subsurface model without its wings are shown in attached SHEET 2. SHEET 3 shows proof of the unique and favorable X regime, which is shown in patent application 677 897.

2. REVIEW OF PHOTOS OF TESTS OF MANNED TH BOATS IN BEACH SURF

Photos of two full size manned TH boats (length 13 and 20 ft.) were shown. Tests covered the following:

- Neutral point in static heel for computer calibration
- Natural period of roll with zero forward speed (a motion which includes effect of virtual mass)
- Pitch attitudes and pitch stability when encountering, large steep, curled, and broken waves.

The photos demonstrated that the intended pitch stability was attained. Photos of these tests are very important for calibration of dynamics in pitch and heel with computer programs having only hydrostatic pitch and roll output, as are those of affordable costs.

3. REVIEW OF PRELIMINARY DESIGNS OF SEVERAL TH BOATS

Based on TH's R&D, model tests and manned boat tests with zero forward speed, conducted under the writer's direction, it has become possible to carry out preliminary designs of TH boats, several of which were shown in the interview with the aid of three-view drawings. These designs follow the principal parameters of the patent applications of TH, including shape, relation of weight to length's cube, power loading (weight to horsepower), and hydrostatic righting moments. Beyond these conventional parameters, the preliminary designs exploit new criteria for TH boats such as beam loading, water plane area loading, longitudinal volume distribution of the present patent application, and lower freeboard. The preliminary designs reviewed are:

- TH-20, a two seater surface sport version derived from manned tests of TH-13
- TH-31, a three seat full stealth surface-subsurface military design for over-the-horizon insertion-extraction of special forces, or as a surface-subsurface sport boat for high speed cruise in rough ocean, or for surfing and penetrating large seas, and for sea rescue.
- TH-60, a powerful fast surface-only luxury yacht

These designs were hydrodynamically advanced, and also provided space for occupants, powerplants, equipment, etc., taking into account riding qualities, entry and exit of occupants, etc.

4. AMENDMENTS TO THE CLAIMS

Following the interview the following amendments are entered hereby:

(a) Cancel Claims 27-31

(b) In amended Claims in Print Ready Format, per amendment of March 4, 2002:

Claim 1	page 5	line 13:	delete "significant"
		line 22	change "said" to -- a --
Claim 4	page 6	line 4:	delete "." insert -- in that --
Claim 16	page 6	line 20:	change "in" to -- at --

(c) On the new Claims submitted in amendment of March 4, 2002:

Claim 40	line 4:	delete "when submerged"
Claim 42	line 14:	delete "when submerged" insert -- a maximum --
Claim 43	delete lines 17-19	
	line 20:	delete "said elongated body"
		insert -- The Structure of Claim 40 --
	line 20:	change "ink" to -- in --
Claim 46	delete lines 3 to 5	insert -- The Structure of Claim 40 --
	line 6:	delete "watercraft"
Claim 47	line 14:	change "aid" to -- air --

Claim 50	page 8:	delete lines 24 to 26
	insert --	The Structure of Claim 40 further characterized in that --
	line 27:	delete "having" insert -- has --
	page 9	line 1: change "and" to -- are --
Claim 51	page 9	line 13: delete "in close proximity to said"
		insert -- in a non obtrusive disposition --

Enter the following Claims:

Claim 53:

A transonic hull having a submerged portion with an approximate triangular static waterplane at water surface, with a bow adjacent its narrow end, and a stern adjacent its broad end; principal right and left side surfaces, and a principal lower surface extending between the lower regions of said side surfaces, said transonic hull being further characterized in having a body above said submerged portion, with said body having:

- (a) a forward end adjacent said bow, a rearward end adjacent said stern, a longitudinal length, and a midbody region;
- (b) a generally triangular body planform adjacent said triangular waterplane with its narrow portion adjacent said forward end and its broad portion adjacent said rearward end, with said rearward end having an athwarship horizontal width;
- (c) a lateral profile in side view with a body height adjacent said midbody region, said lateral profile having a profile height distribution forward of said midbody region which decreases substantially continuously towards said forward end free of radar-reflecting step discontinuities, with a height adjacent said forward end substantially smaller than said body height adjacent said midbody portion;
- (d) a profile height distribution rearward of said midbody portion which extends continuously toward said rearward end free of radar reflecting step discontinuities, with a height adjacent said rearward end smaller than said athwarship horizontal width,
- (e) said body being further characterized in having generally continuous surfaces extending from lateral regions of said body planform to define a body volume above said body planform, with horizontal planview sections of said body volume above said body planform generally free of radar reflecting step discontinuities.

Claim 54:

The structure of Claim 40 further characterized in that said elongated body has a principal submerged surface envelope portion comprised by several flat panels oriented in an approximately streamlined disposition.

5. ALLOWABILITY OF CLAIMS DISCUSSED IN THE INTERVIEW, AND OF OTHER CLAIMS

A review of the specific Claims made during the interview, as well as a review of other important Claims, is summarized below.

5.1 Allowability of Independent Claim 40 (original Claim 20), 41 & 42 as per interview

Original Independent Claim 20 was reviewed during the interview. It covers the wedged shape ends of TH's surface-subsurface body, originally rejected on Mills. Amended Claim 20, rewritten in Independent form as Claim 40 in amendment of March 4, 2002, is allowable as reviewed in the interview, and as is explained in detail in that amendment's pages 10-12, and more particularly in its page 12, lines 14-19 for Claims 40 and 41, in lines 21-24 on Claim 42, and in that amendments SHEET 10.

FOR CONVENIENCE, THE ALLOWABILITY OF CLAIM 40 AND 41 IS SUMMARIZED BELOW, AS REVIEWED DURING THE INTERVIEW:

- Mills teaches two different bodies. His Fig. 2 is for surface only, and his Fig. 1 for subsurface only.
- Mills subsurface body of Fig. 1, necessarily has a forward vertical depth equal to his rear horizontal beam (see Mills Fig. 1).
- In qualitative distinction, and as a hydrodynamically superior feature, applicant's subsurface shape has a vertical length adjacent its forward end substantially smaller than the horizontal width adjacent its stern, as shown in his Fig. 5, and with precision on the scaled sections of his Figs. 5C and 5E.
- Therefore Claims 40, and 41, which specify this distinction, are clearly allowable over Mills and other art, as was discussed with Examiner during the interview.
- Furthermore, in applicant's invention, maximum body height is adjacent midbody as per his Fig. 5A and 5D. In Mills' Fig. 1, his maximum height is necessarily at its front end, another important qualitative distinction. Hence applicant respectfully indicates Claim 42 is also clearly allowable over Mills and others.

5.2 On amendments of formerly independent Claims 43, 46, 50, 51

To simplify prosecution, these Claims are now made dependent on amended Claim 40, and are also allowable as pertaining specific features of the invention shown in drawings and in specifications.

5.3 On dependent Claims 44, 45, 47, 48, 49 and 52

All these Claims are dependent on allowable Claim 40, and each Claims a unique feature of the invention supported by the specifications and Claims. It is respectfully submitted they are allowable.

5.4 On the allowability of amended independent Claim 1

As discussed in amendment of March 4, 2002, amended Claim 1 on TH's surface-subsurface embodiment, incorporates the language of original Claims 17 and 18, which Examiner indicated would be allowable in independent form. Therefore, amended Claim 1 is now allowable.

5.5 On the allowability of new Claim 53

During the interview, applicant reviewed the current efforts of state-of-the-art ships, towards low radar signature (SHEET 4 taken from Navy Times Dec. 2, 2002 showing a stealth Trimaran from General Dynamics, a stealth Catamaran from Lockheed Martin, a stealth surface effect monohull from J. McMullen, and a monohull from Northrop Grumman). Applicant pointed out the unique and superior radar avoiding features of TH's upper body above waterplane, conforming to its triangular shape at waterplane, such as in Figs. 3 and 5 of present applications, with its favorable upper body shape, recommended in page 9 of the specifications (lower middle) and paragraphs (d) of page 18.

This type of upper body which is a new inventive development for TH not shown before, exhibits unique cooperation with TH's triangular waterplane of its submerged shape, as is evident in the carefully drafted Claim 54. It is respectfully submitted, that this new Claim ties the unique cooperation between the waterplane of the submerged hull portion with that of the planform of the upper body with considerable three-dimensional precision, inclusive a requirement not to have step discontinuities in the body's surface which are radar reflective. This Claim was reviewed by Examiner, and he indicated it would be considered for allowance.

5.6 An the Allowability of Claim 54

This is dependent on allowable Claim 40, and is similar to dependent Claim 50, except that it pertains to avoidance of detection when submerged, as indicated in pg. 9, paragraph 9 of the specifications, and as shown in the non circular shapes made principally of submerged flat panels shown in Figs. 5C, D, E and Fig. 3.

6. REMARKS ON ANOTHER CLAIM DISCUSSED AT THE INTERVIEW SUBJECT TO DISCLAIMER.

During the interview applicant reviewed with Examiner the text of another independent Claim covering the basic TH invention, already disclosed in Calderon's published patent 6 158 369. Examiner considered it allowable but could be included in the present application only with a Disclaimer. After considering the matter, applicant elects not to include this basic Claim in this amendment in order not to penalize with the Disclaimer the life of the present invention, which clearly covers matter never disclosed in the aforementioned Calderon patent. Only to complete the record of the interview, the text of the basic Claim not being pursued herein is as follows:

Basic Claim NOT pursued

A transonic hull having in static conditions a submerged portion with a longitudinal length, a bow, and a stern, said submerged portion having:

- (a) an approximately triangular waterplane at water surface with its narrow end adjacent said bow and its broad end adjacent said stern;
- (b) generally upright principal right and left side surfaces extending from adjacent said bow to adjacent the outboard extremities of said stern;
- (c) a principal bottom surface extending between the lower region of said side surfaces;
- (d) said submerged portion having in said static condition a principal submerged volume encompassed by said three principal surfaces, with a forward draft adjacent said bow larger than the rearward draft adjacent said stern.

The reasons reviewed and agreed upon with Examiner for the allowability of the above Claim are outlined as follows:

Applicant focuses the text of the above basic Claim on an important fundamental TH distinction which is patentable over Mills: The only surface boat of Mills is defined in Mills' Fig. 2 and his text. He teaches that the submerged body of his surface boat necessarily has two, and only two, principal surfaces, which therefore must have 90° twist. In fundamental qualitative contrast, the submerged body portion of a surface TH necessarily has at least three principal surfaces (see his Figs. 3 and 5), namely: right and left principal side surfaces which are generally upright, and a principal lower surface extending between the lower regions of the side surfaces.

This is qualitative patentable distinction over Mills recited with precision. The Claim also has the additional limitation of a deeper draft forward, which separates it from other art cited by Examiner in past TH applications, such as the "Japanese" patent.

Applicant is planning to submit the above basic Claim in a Supplemental Amendment to patent application THII 672 190 with a Disclaimer.

7. IMPORTANCE OF INDEPENDENT CLAIMS 1, 25, 40, AND 53,

Applicant indicated in the interview that it is appropriate and it is his responsibility to protect to the maximum extent feasible within patent law, the unique TH embodiments which are being tested in the secluded conditions shown in the photos during the interview, but may become a matter of public demonstration in a forthcoming marketing phase. Applicant anticipates, based on past experience on other inventions that once a TH boat is demonstrated in public, the powerful legal staffs under permanent employment of giant naval firms will attempt, by means of fallacious arguments, to deny the patent on TH.

TH exists as a result of prolonged, laborious, costly, and successful inventive efforts of applicant, covering important engineering and technological dimension. It is believed that amended independent Claims 1, 25, 40, and 53, add strength to applicant's TH patent, and reinforces the Claims already granted by Examiner in his prior action. It is hoped that Examiner, as discussed in the interview, confirms their allowance.

8. TERMINATION OF SERVICES OF PATENT ATTORNEY

Applicant does not have the financial priority to have a patent attorney attend an interview in Washington, and in any case, his attorney did not provide coordination for a trip to travel to Washington, and was not available. His valuable services have already been incorporated in prior amendments filed by him on March 4, 2002. In applicant's view, his presence was not essential for the essential aspects of the interview, and for this supplementary amendment. Hence, his valuable services were terminated for the interview, in respect to this particular application only. Applicant appreciates advice of Examiner not to terminate attorney's services.

Applicant is faxing and mailing the present application promptly, with less than two-weeks time window requested by Examiner. Applicant's address and telephone is shown below.

Respectfully submitted.



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